CLAIMS:

1. A composition comprising:
   (a) a virus-like particle;
   (b) at least one immunostimulatory substance; and
   (c) at least one antigen or antigenic determinant;
   wherein said antigen or antigenic determinant is bound to said virus-like particle, and wherein said immunostimulatory substance is bound to said virus-like particle, and wherein said antigen comprises, alternatively consists essentially of, or alternatively consists of a human melanoma MelanA peptide analogue.

2. The composition of claim 1, wherein said at least one antigen or antigenic determinant is bound to said virus-like particle by at least one covalent bond, and wherein preferably said covalent bond is a non-peptide bond.

3. The composition of claim 1, wherein said at least one antigen or antigenic determinant is fused to said virus-like particle.

4. The composition of any of claims 1 to 3, wherein said human melanoma MelanA peptide analogue is capable of allowing an efficient binding to MHC molecules.

5. The composition of any of claims 1 to 4, wherein said human melanoma MelanA peptide analogue is characterized by two, preferably by a single, amino acid substitution with respect to the corresponding normal MelanA peptide.

6. The composition of any of claims 1 to 4, wherein said human melanoma MelanA peptide analogue is protected from protease or peptidase mediated degradation.

7. The composition of any of claims 1 to 4, wherein said human melanoma MelanA peptide analogue has an amino acid sequence selected from the group consisting of:

(a) LAGIGILTV (SEQ ID NO: 84);
(b) MAGIGILTV (SEQ ID NO: 85);
(c) EAMGIGILTV (SEQ ID NO: 86);
(d) ELAGIGILTV (SEQ ID NO: 50);
(e) EMAGIGILTV (SEQ ID NO: 87);
(f) YAAGIGILTV (SEQ ID NO: 88); and
(g) FAAGIGILTV (SEQ ID NO: 89).

8. The composition of any of claims 1 to 4, wherein said human melanoma MelanA/MART-1 peptide analogue comprises, alternatively consists essentially of, or alternatively consists of the sequence ELAGIGILTV (SEQ ID NO: 50).

9. The composition of any of claims 1 to 8, wherein said virus-like particle comprises at least one first attachment site and wherein said antigen or antigenic determinant further comprises at least one second attachment site being selected from the group consisting of:

(a) an attachment site not naturally occurring with said antigen or antigenic determinant; and
(b) an attachment site naturally occurring with said antigen or antigenic determinant;

and wherein said binding of said antigen or antigenic determinant to said virus-like particle is effected through association between said first attachment site and said second attachment site, wherein preferably said association is through at least one non-peptide bond.

10. The composition of claim 9, wherein said antigen or antigenic determinant and said virus-like particle interact through said association to form an ordered and repetitive antigen array.

11. The composition of claim 9 or 10, wherein said first attachment site comprises, or preferably consists of, an amino group or a lysine residue.

12. The composition of any of the claims 9 to 11, wherein said second attachment site comprises, or preferably consists of, a sulfhydryl group or a cysteine residue.

13. The composition of any of the claims 9 to 12, wherein said first attachment site is a lysine residue and said second attachment site is a cysteine residue.

14. The composition of any of the claims 9 to 13, wherein said first attachment site is an amino group and said second attachment site is a sulfhydryl group

15. The composition of any of the claims 9 to 14, wherein said human melanoma MelanA/MART-1 peptide analogue with said second attachment site has an amino acid sequence selected from the group consisting of:

(a) CGHGHSYTTAEELAGIGILTV (SEQ ID NO: 55);
(b) CGGELAGIGILTV (SEQ ID NO: 57);
(c) CSYTTAEELAGIGILTV ILGVL (SEQ ID NO: 58);
(d) CGGELAGIGILTVILGVL (SEQ ID NO: 59);
(e) ELAGIGILTVGGC (SEQ ID NO: 60);
(f) CSPKSLELAGIGILTV (SEQ ID NO: 92); and
(g) ELAGIGILTVILGVLGGC (SEQ ID NO: 93).

16. The composition of any of the claims 9 to 14, wherein said human melanoma MelanA/MART-1 peptide analogue with said second attachment site has an amino acid sequence of CGHGHSYTTAEELAGIGILTV (SEQ ID NO: 55).

17. The composition of any one of the preceding claims, wherein said virus-like particle lacks a lipoprotein-containing envelope.

18. The composition of any one of the preceding claims, wherein said virus-like particle is a recombinant virus-like particle, wherein preferably said virus like particle is selected from the group consisting of:

(a) recombinant proteins of Hepatitis B virus;
(b) recombinant proteins of measles virus;
(c) recombinant proteins of Sindbis virus;

(d) recombinant proteins of Rotavirus;
(e) recombinant proteins of Foot-and-Mouth-Disease virus;
(f) recombinant proteins of Retrovirus;
(g) recombinant proteins of Norwalk virus;
(h) recombinant proteins of human Papilloma virus;
(i) recombinant proteins of BK virus;
(j) recombinant proteins of bacteriophages;
(k) recombinant proteins of RNA-phages;
(l) recombinant proteins of Ty; and
(m) fragments of any of the recombinant proteins from (a) to (l).

19. The composition of any of the preceeding claims, wherein said virus-like particle is the Hepatitis B virus core protein or the BK virus VP1 protein.

20. The composition of claim 19, wherein said human melanoma MelanA/MART-1 peptide analogue is fused to the C-terminus of said Hepatitis B virus core protein or said BK virus VP1 protein, preferably, by way of a linking sequence.

21. The composition of any one of the preceding claims, wherein said virus-like particle comprises, or alternatively consists essentially of, or alternatively consists of recombinant proteins, or fragments thereof, of a RNA-phage, wherein preferably said RNA-phage is selected from the group consisting of:

(a) bacteriophage Qβ;
(b) bacteriophage R17;
(c) bacteriophage fr;
(d) bacteriophage GA;
(e) bacteriophage SP;
(f) bacteriophage MS2;
(g) bacteriophage M11;
(h) bacteriophage MX1;
(i) bacteriophage NL95;
(j) bacteriophage f2;
(k) bacteriophage PP7; and

(l) bacteriophage AP205.

22. The composition of any one of the preceding claims, wherein said virus-like particle comprises, or alternatively consists essentially of, or alternatively consists of recombinant proteins, or fragments thereof, of bacteriophage Qβ or bacteriophage AP205.

23. The composition of any one of the preceding claims, wherein said immunostimulatory substance is a toll-like receptor activating substance or a cytokine secretion inducing substance, wherein preferably said toll-like receptor activating substance is selected from the group consisting of, or alternatively consists essentially of:

(a) immunostimulatory nucleic acids;
(b) peptidoglycans;
(c) lipopolysaccharides;
(d) lipoteichonic acids;
(e) imidazoquinoline compounds;
(f) flagellines;
(g) lipoproteins;
(h) immunostimulatory organic molecules;
(i) unmethylated CpG-containing oligonucleotides; and
(j) any mixtures of at least one substance of (a), (b), (c), (d), (e), (f), (g), (h) and/or (i).

24. The composition of claim 23, wherein said immunostimulatory nucleic acid is selected from the group consisting of, or alternatively consists essentially of:

(a) ribonucleic acids;
(b) deoxyribonucleic acids;
(c) chimeric nucleic acids; and
(d) any mixtures of at least one nucleic acid of (a), (b) and/or (c).

25. The composition of claim 24, wherein said ribonucleic acid is poly-(I:C) or a derivative thereof.

26. The composition of claim 24, wherein said deoxyribonucleic acid is selected from the group consisting of, or alternatively consists essentially of:
    (a) unmethylated CpG-containing oligonucleotides; and
    (b) oligonucleotides free of unmethylated CpG motifs.

27. The composition of any one of claims 1 to 24 and claim 26, wherein said immunostimulatory substance is an unmethylated CpG-containing oligonucleotide.

28. The composition of claim 27, wherein said unmethylated CpG-containing oligonucleotide comprises the sequence:
    5' X1X2CGX3X4 3'
    and wherein X1, X2, X3, and X4 are any nucleotide.

29. The composition of claim 28, wherein at least one of said nucleotide X1, X2, X3, and X4 has a phosphate backbone modification.

30. The composition of any one of the preceeding claims, wherein said at least one immunostimulatory substance, and preferably said unmethylated CpG-containing oligonucleotide, comprises, or alternatively consists essentially of, or alternatively consists of a palindromic sequence.

31. The composition of claim 27, wherein said unmethylated CpG-containing oligonucleotide comprises, or alternatively consists essentially of, or alternatively consists of the sequence selected from the group consisting of:
    (a) TCCATGACGTTCCTGAATAAT (SEQ ID NO: 35);
    (b) TCCATGACGTTCCTGACGTT (SEQ ID NO: 37);
    (c) GGGGTCAACGTTGAGGGGG (SEQ ID NO: 39);
    (d) GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41); and
    (e) "dsCyCpG-253" (SEQ ID NO: 49) as described in Table 2,

and wherein preferably said unmethylated CpG-containing oligonucleotide contains one or more phosphorothioate modifications of the phosphate backbone or wherein each phosphate moiety of said phosphate backbone of said oligonucleotide is a phosphorothioate modification.

32. The composition of claim 27, wherein said unmethylated CpG-containing oligonucleotide comprises, or alternatively consists essentially of, or alternatively consists of the sequence GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41).

33. The composition of any of the preceeding claims,wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic acid, and even more preferably said unmethylated CpG-containing oligonucleotide contains one or more phosphorothioate modifications of the phosphate backbone or wherein each phosphate moiety of said phosphate backbone of said oligonucleotide is a phosphorothioate modification.

34. The composition of any one of the preceeding claims, wherein said immunostimulatory substance is non-covalently bound to said virus-like particle.

35. The composition of any one of the preceeding claims, wherein said at least one immunostimulatory substance, and preferably said unmethylated CpG-containing oligonucleotide is non-covalently bound to said virus-like particle.

36. The composition of any of the preceeding claims, wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic acid, and even more preferably said unmethylated CpG-containing oligonucleotide, comprises about 6 to about 100,000 nucleotides, preferably about 6 to about 2000 nucleotides, and more preferably about 20 to about 500 nucleotides, and even more preferably about 20 to about 100 nucleotides.

37. The composition of any of the preceding claims, wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic

acid, and even more preferably said unmethylated CpG-containing oligonucleotide, is selected from

(a) a recombinant oligonucleotide;

(b) a genomic oligonucleotide;

(c) a synthetic oligonucleotide;

(d) a plasmid-derived oligonucleotide;

(e) a single-stranded oligonucleotide; and

(f) a double-stranded oligonucleotide.

38. The composition of claim 30, wherein said palindromic sequence comprises, or alternatively consists essentially of, or alternatively consists of GACGATCGTC (SEQ ID NO: 1).

39. The composition of claim 38, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

40. The composition of claim 38, wherein said palindromic sequence is flanked at its 5'-terminus by at least 4 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

41. The composition of claim 38, wherein said palindromic sequence is flanked at its 5'-terminus by at least 5 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

42. The composition of claim 38, wherein said unmethylated CpG-containing oligonucleotide has a nucleic acid sequence selected from

(a) GGGGACGATCGTCGGGGGG ((SEQ ID NO: 2);

(b) GGGGGACGATCGTCGGGGGG ((SEQ ID NO: 3);

(c) GGGGGGACGATCGTCGGGGGG ((SEQ ID NO: 4);

(d) GGGGGGGACGATCGTCGGGGGG ((SEQ ID NO: 5);

(e) GGGGGGGGACGATCGTCGGGGGGG ((SEQ ID NO:6);

(f) GGGGGGGGGACGATCGTCGGGGGGGG ((SEQ ID NO: 7);

(g) GGGGGGGGGGACGATCGTCGGGGGGGGG ((SEQ ID NO: 8);

(h) GGGGGGCGACGACGATCGTCGTCGGGGGGG ((SEQ ID NO: 9); and

(i) GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41).

43. The composition of claim 27 or 38, wherein said unmethylated CpG-containing oligonucleotide has a nucleic acid sequence of SEQ ID NO: 7 or SEQ ID NO: 41.

44. The composition of any one of the preceding claims, wherein said antigen comprises a cytotoxic T cell epitope, a Th cell epitope or a combination of at least two of said epitopes, wherein said at least two epitopes are bound directly or by way of a linking sequence, and wherein preferably said cytotoxic T cell epitope is a viral or a tumor cytotoxic T cell epitope.

45. The composition of claim 44, wherein said antigen comprises a combination of at least one cytotoxic T cell epitope and of at least one Th cell epitope, and wherein said combination is MelanA 1-118 A/L (SEQ ID NO: 94)

46. A method for enhancing an immune response in an animal comprising introducing into said animal a composition comprising:

(a) a virus-like particle;

(b) at least one immunostimulatory substance; and

(c) at least one antigen or antigenic determinant;

wherein said antigen or antigenic determinant is bound to said virus-like particle, wherein said immunostimulatory substance is bound to said virus-like particle, and wherein said antigen comprises, alternatively consists essentially of, or alternatively consists of a human melanoma MelanA peptide analogue.

47. The method of claim 46, wherein said at least one antigen or antigenic determinant is bound to said virus-like particle by at least one covalent bond, and wherein said covalent bond is a non-peptide bond.

48. The method of claim 46, wherein said at least one antigen or antigenic determinant is fused to said virus-like particle.

49. The method of any one of claims 46 to 48, wherein said human melanoma MelanA peptide analogue is capable of allowing an efficient binding to MHC molecules.

50. The method of any one of claims 46 to 49, wherein said human melanoma MelanA peptide analogue is characterized by two, preferably by a single, amino acid substitution with respect to the corresponding normal MelanA peptide.

51. The method of any one of claims 46 to 50, wherein said human melanoma MelanA peptide analogue is protected from protease or peptidase mediated degradation.

52. The method of any one of claims 46 to 51, wherein said human melanoma MelanA peptide analogue has an amino acid sequence selected from the group consisting of:

(a) LAGIGILTV (SEQ ID NO: 84);
(b) MAGIGILTV (SEQ ID NO: 85);
(c) EAMGIGILTV (SEQ ID NO: 86);
(d) ELAGIGILTV (SEQ ID NO: 50);
(e) EMAGIGILTV (SEQ ID NO: 87);
(f) YAAGIGILTV (SEQ ID NO: 88); and
(g) FAAGIGILTV (SEQ ID NO: 89).

53. The method of any one of claims 46 to 51, wherein said human melanoma MelanA/MART-1 peptide analogue comprises, alternatively consists essentially of, or alternatively consists of the sequence ELAGIGILTV (SEQ ID NO: 50).

54. The method of any one of claims 46 to 53, wherein said virus-like particle comprises at least one first attachment site and wherein said antigen or antigenic determinant further comprises at least one second attachment site being selected from the group consisting of:

(a) an attachment site not naturally occurring with said antigen or antigenic determinant; and

(b) an attachment site naturally occurring with said antigen or antigenic determinant;

and wherein said binding of said antigen or antigenic determinant to said virus-like particle is effected through association between said first attachment site and said second attachment site, wherein preferably said association is through at least one non-peptide bond.

55. The method of claim 54, wherein said antigen or antigenic determinant and said virus-like particle interact through said association to form an ordered and repetitive antigen array.

56. The method of claim 54 or 55, wherein said first attachment site comprises, or preferably consists of, an amino group or a lysine residue.

57. The method of any of the claims 54 to 56, wherein said second attachment site comprises, or preferably consists of, a sulfhydryl group or a cysteine residue.

58. The method of any of the claims 54 to 57, wherein said first attachment site is a lysine residue and said second attachment site is a cysteine residue.

59. The method of any of the claims 54 to 58, wherein said first attachment site is an amino group and said second attachment site is a sulfhydryl group.

60. The method of any of the claims 54 to 59, wherein said human melanoma MelanA/MART-1 peptide analogue with said second attachment site has an amino acid sequence selected from the group consisting of:

(a) CGHGHSYTTAEELAGIGILTV (SEQ ID NO: 55);
(b) CGGELAGIGILTV (SEQ ID NO: 57);
(c) CSYTTAEELAGIGILTV ILGVL (SEQ ID NO: 58);
(d) CGGELAGIGILTVILGVL (SEQ ID NO: 59); and
(e) ELAGIGILTVGGC (SEQ ID NO: 60);
(f) CSPKSLELAGIGILTV (SEQ ID NO: 92); and
(g) ELAGIGILTVILGVLGGC (SEQ ID NO: 93).

61. The method of any of the claims 54 to 59, wherein said human melanoma MelanA/MART-1 peptide analogue with said second attachment site has an amino acid sequence of CGHGHSYTTAEELAGIGILTV (SEQ ID NO: 55).

62. The method of any one of claims 46 to 61, wherein said virus-like particle is a recombinant virus-like particle, wherein preferably said virus-like particle is selected from the group consisting of:
(a) recombinant proteins of Hepatitis B virus;
(b) recombinant proteins of measles virus;
(c) recombinant proteins of Sinbis virus;
(d) recombinant proteins of Rotavirus;
(e) recombinant proteins of Foot-and-Mouth-Disease virus;
(f) recombinant proteins of Retrovirus;
(g) recombinant proteins of Norwalk virus;
(h) recombinant proteins of human Papilloma virus;
(i) recombinant proteins of BK virus;
(j) recombinant proteins of bacteriophages:
(k) recombinant proteins of RNA-phages;
(l) recombinant proteins of Ty; and
(m) fragments of any of the recombinant proteins from (a) to (l).

63. The method of any of claims 46 to 62, wherein said virus-like particle is the Hepatitis B virus core protein or the BK virus VP1 protein.

64. The method of claim 63, wherein said human melanoma MelanA/MART-1 peptide analogue is fused to the C-terminus of said Hepatitis B virus core protein or said BK virus VP1 protein, preferably, by way of a linking sequence.

65. The method of any one of claims 46 to 64, wherein said virus-like particle comprises recombinant proteins, or fragments thereof, of a RNA-phage, and wherein preferably said RNA-phage is selected from the group consisting of:

(a) bacteriophage Qβ;
(b) bacteriophage R17;
(c) bacteriophage fr;
(d) bacteriophage GA;
(e) bacteriophage SP;
(f) bacteriophage MS2;
(g) bacteriophage M11;
(h) bacteriophage MX1;
(i) bacteriophage NL95;
(j) bacteriophage f2;
(k) bacteriophage PP7; and
(l) bacteriophage AP205.

66. The method of any of claims 46 to 65, wherein said virus-like particle comprises, or alternatively consists essentially of, or alternatively consists of recombinant proteins, or fragments thereof, of bacteriophage Qβ or bacteriophage AP205.

67. The method of any one of claims 46 to 66, wherein said immunostimulatory substance is a toll-like receptor activating substance or a cytokine secretion inducing substance, and wherein preferably said toll-like receptor activating substance is selected from the group consisting of, or alternatively consists essentially of:

(a) immunostimulatory nucleic acids;
(b) peptidoglycans;
(c) lipopolysaccharides;

(d) lipoteichonic acids;
(e) imidazoquinoline compounds;
(f) flagellines;
(g) lipoproteins;
(h) immunostimulatory organic molecules;
(i) unmethylated CpG-containing oligonucleotides; and
(j) any mixtures of at least one substance of (a), (b), (c), (d), (e), (f), (g), (h) and/or (i).

68. The method of claim 67, wherein said immunostimulatory nucleic acid is selected from the group consisting of, or alternatively consists essentially of:
(a) ribonucleic acids;
(b) deoxyribonucleic acids;
(c) chimeric nucleic acids; and
(d) any mixtures of at least one nucleic acid of (a), (b) and/or (c).

69. The method of claim 68, wherein said ribonucleic acid is poly-(I:C) or a derivative thereof.

70. The method of claim 68, wherein said deoxyribonucleic acid is selected from the group consisting of, or alternatively consists essentially of:
(a) unmethylated CpG-containing oligonucleotides; and
(b) oligonucleotides free of unmethylated CpG motifs.

71. The method of any one of claims 46 to 68 and claim 70, wherein said immunostimulatory substance is an unmethylated CpG-containing oligonucleotide.

72. The method of claim 71, wherein said unmethylated CpG-containing oligonucleotide comprises the sequence:

5' $X_1X_2CGX_3X_4$ 3'

and wherein X_1, X_2, X_3, and X_4 are any nucleotide.

73. The method of claim 72 wherein at least one of said nucleotide X_1, X_2, X_3, and X_4 has a phosphate backbone modification.

74. The method of any of claims 46 to 73, wherein said at least one immunostimulatory substance, and preferably said unmethylated CpG-containing oligonucleotide, comprises, or alternatively consists essentially of, or alternatively consists of a palindromic sequence.

75. The method of claim 71, wherein said unmethylated CpG-containing oligonucleotide comprises, or alternatively consists essentially of, or alternatively consists of the sequence selected from the group consisting of:

(a) TCCATGACGTTCCTGAATAAT (SEQ ID NO: 35);

(b) TCCATGACGTTCCTGACGTT (SEQ ID NO: 37);

(c) GGGGTCAACGTTGAGGGGG (SEQ ID NO: 39);

(d) GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41); and

(e) "dsCyCpG-253" (SEQ ID NO: 49) as described in Table 2;

and wherein preferably said unmethylated CpG-containing oligonucleotide contains one or more phosphorothioate modifications of the phosphate backbone or wherein each phosphate moiety of said phosphate backbone of said oligonucleotide is a phosphorothioate modification.

76. The method of claim 71, wherein said unmethylated CpG-containing oligonucleotide is palindromic, and wherein preferably said palindromic unmethylated CpG-containing oligonucleotide comprises, or alternatively consists of the sequence GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41).

77. The method of any of claims 46 to 76, wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic acid, and even more preferably said unmethylated CpG-containing oligonucleotide contains one or more phosphorothioate modifications of the

phosphate backbone or wherein each phosphate moiety of said phosphate backbone of said oligonucleotide is a phosphorothioate modification.

78. The method of any one of claims 46 to 77, wherein said immunostimulatory substance, and preferably said unmethylated CpG-containing oligonucleotide, is non-covalently bound to said virus-like particle.

79. The method of any one of claims 46 to 78, wherein said immunostimulatory substance, and preferably said unmethylated CpG-containing oligonucleotide, is packaged, preferably enclosed by said virus-like particle.

80. The method of any one of claims 46 to 79, wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic acid, and even more preferably said unmethylated CpG-containing oligonucleotide, comprises about 6 to about 100,000 nucleotides, and preferably wherein said immunostimulatory nucleic acid, and preferably said unmethylated CpG-containing oligonucleotide comprises 20 to 100 nucleotides.

81. The method of any one of claims 46 to 80, wherein said at least one immunostimulatory substance, and preferably said immunostimulatory nucleic acid, and even more preferably said unmethylated CpG-containing oligonucleotide, is selected from

(a) a recombinant oligonucleotide;
(b) a genomic oligonucleotide;
(c) a synthetic oligonucleotide;
(d) a plasmid-derived oligonucleotide;
(e) a single-stranded oligonucleotide; and
(f) a double-stranded oligonucleotide.

82. The method of claim 74, wherein said palindromic sequence comprises, or alternatively consists essentially of, or alternatively consists of GACGATCGTC (SEQ ID NO: 1).

83. The method of claim 82, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

84. The method of claim 82, wherein said palindromic sequence is flanked at its 5'-terminus by at least 4 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

85. The method of claim 82, wherein said palindromic sequence is flanked at its 5'-terminus by at least 5 and at most 10 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 10 guanosine entities.

86. The method of claim 82, wherein said unmethylated CpG-containing oligonucleotide has a nucleic acid sequence selected from

(a) GGGGACGATCGTCGGGGGG ((SEQ ID NO: 2);
(b) GGGGGACGATCGTCGGGGGG ((SEQ ID NO: 3);
(c) GGGGGGACGATCGTCGGGGGG ((SEQ ID NO: 4);
(d) GGGGGGGACGATCGTCGGGGGG ((SEQ ID NO: 5);
(e) GGGGGGGGACGATCGTCGGGGGGG ((SEQ ID NO:6);
(f) GGGGGGGGGACGATCGTCGGGGGGGG ((SEQ ID NO: 7);
(g) GGGGGGGGGGACGATCGTCGGGGGGGGG ((SEQ ID NO: 8);
(h) GGGGGGCGACGACGATCGTCGTCGGGGGGG ((SEQ ID NO: 9); and
(i) GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41).

87. The method of claim 71 or 82, wherein said unmethylated CpG-containing oligonucleotide has a nucleic acid sequence of SEQ ID NO: 7 or SEQ ID NO: 41.

88. The method of any one of claims 46 to 87, wherein said antigen comprises a cytotoxic T cell epitope, a Th cell epitope or a combination of at least two of said epitopes, wherein said at least two epitopes are linked directly or by way of a linking sequence, and wherein preferably said cytotoxic T cell epitope is a viral or a tumor cytotoxic T cell epitope.

89. The method of any one of claims 46 to 87, wherein said immune response is an enhanced B cell response or an enhanced T cell response, wherein preferably said T cell response is a CTL response or a Th cell response, and wherein even more preferably said Th cell response is a Th1 cell response.

90. The method of any of claims 46 to 89, wherein said animal is a mammal, and wherein preferably said mammal is a human.

91. The method of any of claims 46 to 90, wherein said composition is introduced into said animal subcutaneously, intramuscularly, intravenously, intranasally or directly into the lymph node.

92. A vaccine comprising an immunologically effective amount of the composition of any one of claim 1 to 45 together with a pharmaceutically acceptable diluent, carrier or excipient, and wherein preferably said vaccine further comprises an adjuvant.

93. A method of immunizing or treating an animal comprising administering to said animal an immunologically effective amount of the vaccine of claim 92.

94. The method of claim 93, wherein said animal is a mammal, and wherein preferably said mammal is a human.

95. A method of immunizing or treating an animal comprising priming a T cell response in said animal by administering an immunologically effective amount of the vaccine of claim 92.

96. The method of claim 95, further comprising the step of boosting the immune response in said animal, wherein preferably said boosting is effected by administering an immunologically effective amount of a vaccine of claim 92 or an immunologically effective amount of a heterologous vaccine, wherein even more preferably said heterologous vaccine is a DNA vaccine.

97. A method of immunizing or treating an animal comprising the steps of priming a T cell response in said animal, and boosting a T cell response in said animal, wherein said boosting is effected by administering an immunologically effective amount of the vaccine of claim 92.

98. The method of claim 97, wherein said primimg is effected by administering an immunologically effective amount of a vaccine of claim 92 or an immunologically effective amount of a heterologous vaccine, and wherein even more preferably said heterologous vaccine is a DNA vaccine.